

Working Towards Field Implementation of LF Bioreactors

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Regulatory Drivers

- ▶ *RD&D rule, proposed June 2002*
40 CFR part 258.
- ▶ *40 CFR Part 63, NESHAPS Rule, January 16, 2003*



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Transition of Policy Impacting the Research

- *Presently few operating sites with outside liquid addition.*
- *Agency focus on Biosolids Safety in land spreading and landfills.*
- *Need for green energy in the United States.*
- *Trading of greenhouse gas emission credits, establishment of CCX.*



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USEPA/WM CRADA

- ✦ *5 year Cooperative Research & Development Agreement.*
- ✦ *Rigid QA/QC procedures through a QAPP.*
- ✦ *Designed for Statistical Interpretation.*
- ✦ *Four LF Bioreactors, Two Control Subtitle D Cells.*



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CRADA Project Objectives

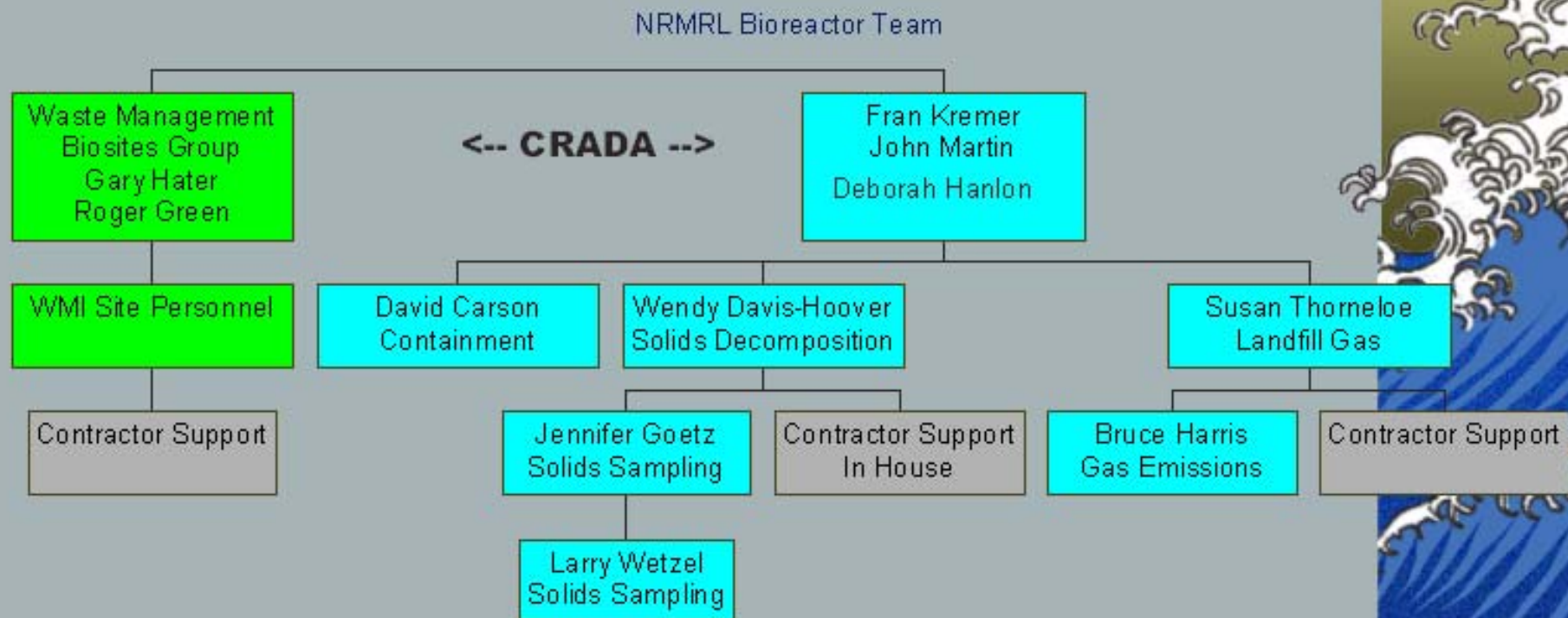
- *To determine the parameters and trends that should be monitored to assess the performance of and control a bioreactor landfill.*
 - *Leachate*
 - *Gas Management/Fugitive Emissions*
 - *Solids Decomposition*
- *Two primary sites*
 - *Area 7 – New fill*
 - *Area 5 – Existing fill to be retrofitted, and will use nitrified leachate to control ammonia levels*
 - *Shared experimental control area*



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CRADA Team Structure



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The Site

GENERAL INFORMATION:

THE SITE CONTAINS 782.15 acres
 NUMBER OF TRUCKS DELIVERING
 WASTE TO SITE DAILY - 600-700
 NUMBER OF MILES OF INTERNAL ROADS - 11.87
 NUMBER OF VISITORS ANNUALLY - 800
 NUMBER OF TREES PLANTED - 430 PER AC.
 COUNTIES PERMITTED IN KENTUCKY TO DISPOSE OF MSW 18
 COUNTIES PERMITTED IN INDIANA TO DISPOSE OF MSW 4
 AREA ZONING: M-3 INDUSTRIAL

MATERIAL ACCEPTED FOR DISPOSAL IN 2001:

TONS OF COG/SOLID WASTE/SPECIAL WASTE - 1,049,869
 TONS OF NON-HAZARDOUS LIQUID/SLUDGE SOLIDIFIED - 19,793
 TONS OF COMPOST PROCESSED - 34,993
 TONS OF PETROLEUM CONTAMINATED SOIL
 BIOLOGICALLY TREATED - 58,955

METHANE GAS - 2001:

TOTAL NUMBER OF GAS WELLS - 127
 NUMBER OF FLARES - 2
 CUBIC FEET OF GAS GENERATED DAILY - 6,480,000
 MILLION CUBIC FEET SOLD TO GENERAL ELECTRIC - 1,122,808

LEACHATE - 2001:

GALLONS OF LEACHATE PRETREATED AND DISCHARGED
 TO MSD - 35,842,124 GALLONS
 GALLONS OF NON-HAZARDOUS LIQUID COMMERCIAL WASTE
 TREATED AT THE SBR AND DISCHARGED TO MSD
 - 1,498,528 GALLONS

FLOODPLAIN - 2001:

FLOODPLAIN CONSUMED - 1,458,391 c.y.
 FLOODPLAIN COMPENSATED - 1,955,618 c.y.

MONITORING - 2001:

NUMBER OF PERMITTED KPDES POINT CHARGES - 23
 TOTAL NUMBER OF GROUNDWATER WELLS - 45
 TOTAL NUMBER OF UNDERDRAINS - 8

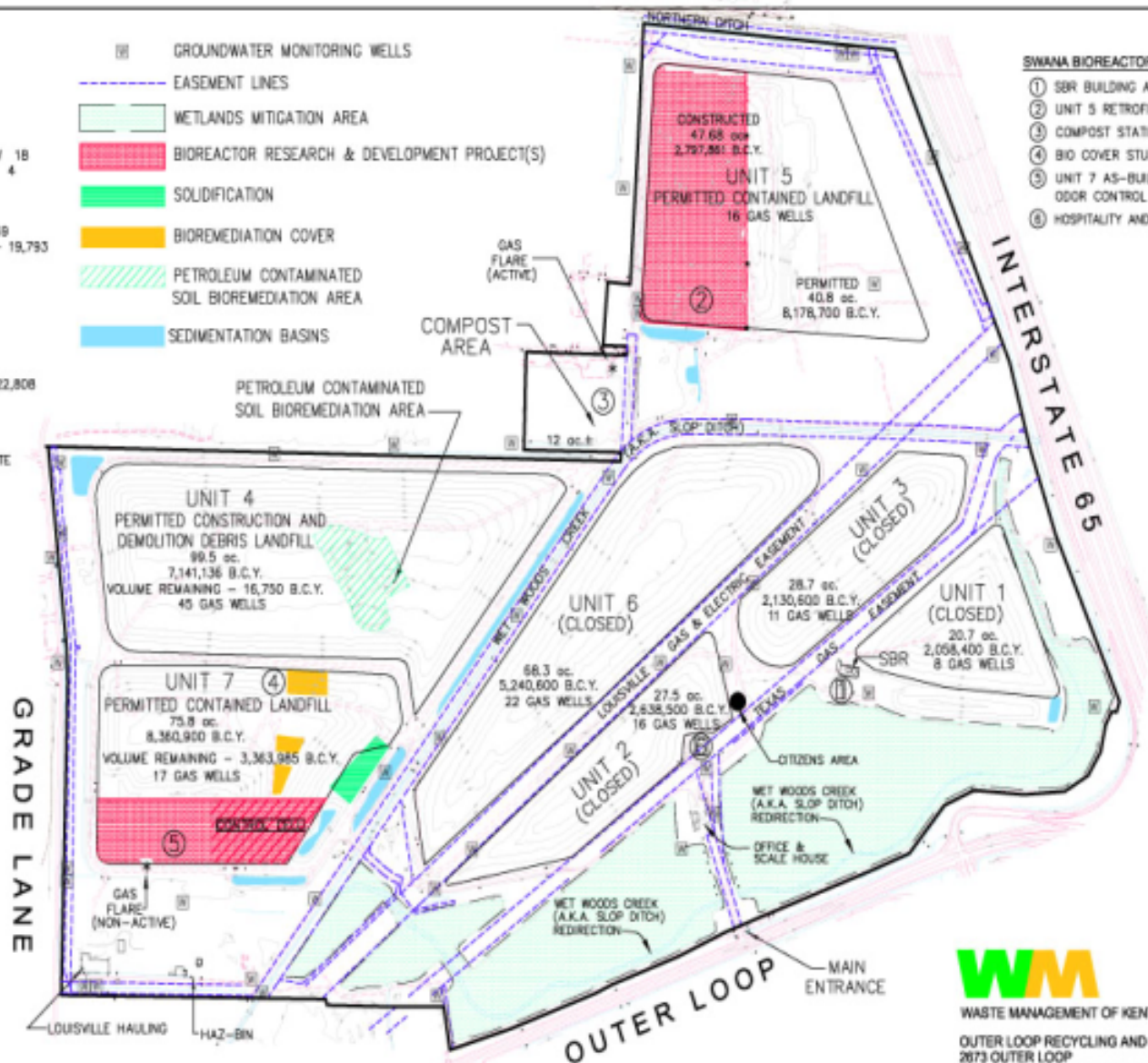
WETLANDS - 2001:

ON-SITE WETLANDS PERMITTED
 TO IMPACT - 190 ac.
 ON-SITE WETLANDS
 MITIGATION - 135.8 ac.
 OFF-SITE WETLANDS
 MITIGATION - SWARTZ.....20.4 ac.
 BOSTON.....280 ac.
 HARNED.....43 ac.

EASEMENTS:

LOUISVILLE GAS & ELECTRIC CO.:
 27.8 acres
 TEXAS GAS TRANSMISSION CO.:
 14.8 acres
 LOUISVILLE WATER CO.:
 2.5 acres
 METROPOLITAN SEWER DISTRICT:
 SEWER & DRAINAGE.....3.8 acres
 SEWER.....2.5 acres
 DRAINAGE.....24.1 acres
 INGRESS & EGRESS.....0.88 acres
 BELL SOUTH TELECOM:
 0.32 acres
 INDUSTRIAL PIPELINES:
 0.68 acres

- GROUNDWATER MONITORING WELLS
- EASEMENT LINES
- WETLANDS MITIGATION AREA
- BIOREACTOR RESEARCH & DEVELOPMENT PROJECT(S)
- SOLIDIFICATION
- BIOREMEDIATION COVER
- PETROLEUM CONTAMINATED SOIL BIOREMEDIATION AREA
- SEDIMENTATION BASINS



SWANA BIOREACTOR TOUR ITINERARY:

- 1 SBR BUILDING AND WETLANDS
- 2 UNIT 5 RETROFIT BIOREACTOR
- 3 COMPOST STATION AND GAS FLARE
- 4 BIO COVER STUDY
- 5 UNIT 7 AS-BUILT BIOREACTOR AND ODOR CONTROL
- 6 HOSPITALITY AND DATA REVIEW CENTER



WASTE MANAGEMENT OF KENTUCKY, L.L.C.

OUTER LOOP RECYCLING AND DISPOSAL FACILITY
 2673 OUTER LOOP
 LOUISVILLE, KENTUCKY 40219
 (502) 686-0272

May 2002

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USEPA/WM CRADA

- ▶ *Progress Report is Due out in 2003.*
- ▶ *Conference Publish Rate is >4 /year.*
- ▶ *Additional Sites to be Added in Future.*

Unique Features:

- ▶ *Air Emissions Monitoring.*
- ▶ *Outside Liquid Addition.*
- ▶ *Compost Cover Study.*
- ▶ *High Biosolids Rate.*



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What Designs to Study?

- ✦ *As Built vs. Retrofit*
- ✦ *Anaerobic*
- ✦ *Facultative*
- ✦ *Aerobic-Anaerobic*
- ✦ *Aerobic*



**Surface Application of Liquids in
a “as built” System.**